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**THE
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Some of the early volumes of the Society's Transactions are out of print, but those which are in stock can be obtained at reduced prices. Any single volume of the present series, 1868-1887, is sold at 10s. to Fellows. The volumes for 1868-1890, in sets of not less than five, as well as the five of the Third Series (1862-1867), can be obtained by Fellows at greatly reduced prices on application to the Librarian. The following is a price list of recently published parts of the TRANSACTIONS—

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1926.—Transactions, Vol. LXXIV: Part I, £3 0s. 0d., to Fellows, £2 5s. 0d.; Part II, £3 10s. 0d., to Fellows, £2 12s. 6d.

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The 1893 CATALOGUE OF THE LIBRARY, with Supplement to 1900, is published at 10s.; to Fellows, 7s. The Supplement only, 4s. 6d.; to Fellows, 3s.

THE PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF LONDON

VOL. II.

1927.

Wednesday, February 2nd, 1927.

Mr. J. E. COLLIN, President, in the Chair.

Nomination of Vice-Presidents.

The President announced that he had nominated Dr. E. A. COCKAYNE, Mr. J. C. F. FRYER, and Professor E. B. POULTON as Vice-Presidents for the coming year.

Election of Fellow.

The following was elected a Fellow of the Society :—C. H. NEWTON JACKSON, B.Sc., Cayton, York Road, St. Albans.

Exhibits.

A SERIES OF *PERONEA HASTIANA*.—Mr. W. G. SHELDON exhibited a series of *Peronea hastiana*, consisting of (1) Types of 36 of the more striking forms. (2) A series of 13 specimens forming a graduated series from form *rufivittana*, Shldn., to *rufivittana* × *albimaculana*, Shldn. (3) A series of specimens showing the main characteristics of two forms, for instance, form *mayrana*, Hb., with the dark longitudinal streaks of form *leucophaeana*. (4) Long series of the very rare forms, *albana*, Shldn.,—with an example with an additional central longitudinal red streak—and *albimaculana*, Shldn., with examples having additional red central longitudinal streaks, and also examples with a red tranverse striga.

THE EFFECT ON INSECTS OF THE STING OF *EUMENES*.—The SECRETARY communicated the following note by Mr. G. R. DUTT.

“ I have read with great interest a short note, regarding complete recovery of a Blattid from the sting of a Pompilid wasp, which has appeared in the recently published *Proceedings of the Entomological Society of London*, vol. i, p. 13 (November 1926). During the past sixteen years, several such instances have come under my observation, and I have definite notes regarding two of them, which relate to the year 1912. Once, from a couple of freshly constructed mud-cells of *Eumenes conica*,

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B

Fb., paralysed larvae of *Plecoptera reflexa*, Guen., were removed, most of which pupated successfully, but only one emerged as a moth, and the rest died. On the second occasion a paralysed larva of *Bombyx mori*, Linn., was snatched from a *Eumenes conica* flying with the victim to her mud-cell. The caterpillar succeeded in spinning a flimsy sort of cocoon, from which a moth emerged in due course. My impression is that the chances of revival of larvae stung by Fossores are inversely proportionate to the period they pass in the cells of wasps; in other words, the longer the period of captivity, the less are the chances of resuscitation. In both the cases cited above the larvae had passed not more than two days in the wasp's cell, the result being that most of them pupated, but only one attained the adult stage. Those that could not pupate were probably inmates of the older cell, and the one which attained the adult stage was perhaps the last one brought into the cell. The *Bombyx* larva which was intercepted on the way reached the adult stage for a similar reason. I, therefore, cannot agree with the author of *Nature at the Desert's Edge*, when he says that 'this recovery is a normal occurrence.' Victims which have passed three or more days in confinement in a wasp's cell have very little chance of recovery."

BUTTERFLIES FROM COLOMBIA.—Mr. A. DICKSEE exhibited the following butterflies from Canungucho, Southern Colombia, which were apparently new to that country.

1. *Agrias beata*, Stgr. (one of them the form *nigra*), the known habitat of which so far as at present known, is Central Peru. This species has a scarlet mark on the underside of the hind-wings and a scarlet streak down the inner margin. In North Peru and South Ecuador it is replaced by *beatifica*, where the mark is orange and extends a third of the way across the wing. Further north still it is replaced by *pherenice*, where the mark is yellow and extends all over the wing, with the exception of the submarginal row of spots. It is difficult to understand therefore why it reappears as *A. beata* further north still, unless, as Staudinger contended originally, it is a distinct species.

2. A series of *Morpho hecuba*, L., intermediate between *cisseis*, Feldr., and *phanodemus*, Hew., together with a normal *cisseis*, and also two specimens of the new subspecies *weneri*, Hopp. The previous locality of this was Putomayo. Mr. Dicksee suggested that as a brown form had now occurred at the same place and time as the blue and green forms, was it not likely that the brown marks that so often occurred on the blue and green forms, came from *weneri* and not from *hecuba*; and as there is apparently no record of the orange form of *hecuba* occurring west of Obidos, whether after all they were not perhaps different species.

3. An aberration *Papilio euryleon*, Hew., from Rio Cauca. This aberration, instead of having all the discal spots on the hind-wings red, has only two on the left wing red, the rest white, and the whole of the right wing white.

NEW BRITISH DIPTERA.—The PRESIDENT exhibited specimens of, and communicated a note on, two additions to the List of British Diptera:—

1. *Actenoptera hilarella*, Zett. Originally described as a *Heteromyza*, was made the type of a new genus *Gymnomyza* by Strobl in 1894 (*Dipt. v. Steierm.*, II, 85). In 1904 (*Wien. Ent. Zeit.*, p. 202) Czerny pointed out that the name *Gymnomyza* had

previously been used for a genus of Diptera by Fallen in 1810 (*Spec. Ins.*, p. 19) and proposed the new name *Actenoptera*, a very unfortunate choice of a name, because there was already in the Diptera a generic name *Actinoptera*, Rdi, 1871 (*Bull. Soc. Ent. Ital.*, iii, 162).

The correct systematic position of this genus has only recently been established, for long it remained in the HELOMYZIDAE, but Czerny in 1904 refused to include it in that family and relegated it to the neighbourhood of *Neottiophilum*. Hendel has since (*Konowia*, 1922, p. 156) placed it in a new family NEOTTIOPHILIDAE next to the DRYOMYZIDAE.

It is a yellow fly very much like a pale *Dryomyza*, from which genus it can at once be distinguished by the presence of a pair of strong vibrissae, and the absence of any preapical bristle to the tibiae. In these two characters and in the bristly subcostal vein it agrees with *Neottiophilum*. It also agrees with that genus in general chaetotaxy, except that the two pairs of upper orbital bristles are more developed and the front pair more separated from the hind pair, while there is a third pair of fine incurved orbitals at extreme front of frons. There is a pair of pre-scutellar acrostichals which are absent in *Neottiophilum*, and three strong bristles close together in a row on upper margin of sternopleura. The wings are not maculated as in *Neottiophilum*, though there may be a faint yellowish-brown clouding along costa towards tip of wing.

A single female specimen was captured by Mr. B. Harwood at Sudbury (Suffolk) in 1925.

Described from a Norwegian specimen in 1847, it has since been recorded from only Styria and the Tatra.

2. *Bischofia dryomyzina*, Zett. The genus *Bischofia* was founded in 1902 for those species of *Sciomyza* with plumose arista having a pair of preapical bristles to each front tibia instead of the usual one bristle and other small chaetotactic differences. *B. dryomyzina* may be distinguished from *simplex*, Fln. (the only other known British species), by the thorax being entirely yellowish and not dark grey on the disc, by the shorter, finer and less numerous bristles on hind margin of mesopleura, and by its darker front legs. The antennae are yellow in both species.

Mr. Harwood caught a male at Sudbury (Suffolk) in 1921 and a female at Henny on the river Stour (Essex) in July of the same year.

This species has a wide distribution throughout Northern Europe from Lapland and N.W. Siberia to Bavaria and Thuringia.

Brig.-Genl. B. H. COOKE exhibited some aberrations of European butterflies.

Major R. W. G. HINGSTON gave an account of his paper on the liquid-squirting habits of grasshoppers.

Papers.

The following papers were read :—

1. "The Male Genitalia of the Hepialidae," by Mr. A. PHILPOTT.
2. "An aquatic Lampyrid larva from S. Celebes," by Mr. K. G. BLAIR, B.Sc.

Wednesday, March 2nd, 1927.

Mr. J. E. COLLIN, President, in the Chair.

Obituary.

The PRESIDENT announced the death of Mr. G. T. PORRITT, one of the senior Fellows of the Society.

Election of Fellows.

The following were elected Fellows of the Society :—H. B. LAWSON, Brock Hill, Horsell, Woking, Surrey; J. V. PEARMAN, 6, Westbury Park, Bristol.

Fourth International Congress of Entomology.

The SECRETARY read a letter from Dr. K. JORDAN giving preliminary notice that the Fourth International Congress of Entomology would be held at Ithaca, New York, U.S.A., in August 1928.

Exhibits.

QUANTITATIVE EXPERIMENTS ON THE URIC ACID IN THE PIERIDAE.—Dr. V. B. WIGGLESWORTH said : “ Since the classic researches of Hopkins it has been known that the family PIERIDAE is peculiar among Lepidoptera in making use of uric acid in the pigmentation of the wings. A quantitative study of the uric acid in *Pieris brassicae* has been made. The wings of the male contain 0.5 mgm. and of the female 0.3 mgm. of uric acid. This sexual difference is not due to the androconia of the male, which contain no uric acid, but to the greater size of the wing-scales which cover these. The pupa of *P. brassicae* contains about 2.0 mgms. of uric acid. This total amount is not changed during development. In the resting pupa most, if not all, of the uric acid is contained in the fat-body. Shortly before emergence some is deposited in the wings and more is transferred to the gut. There is no evidence for a new formation of uric acid during pupal life. Similar experiments have been made on *Vanessa urticae*. The total quantity of uric acid is approximately the same as in *P. brassicae*. During development it is transferred in part to the gut but not to the wings. The PIERIDAE appear to differ from other families in the use to which uric acid is put and not in the amount of this substance produced.

“ These experiments are published in detail in *Proc. Roy. Soc.*, B, 97, pp. 149—155.”

THE METAMORPHOSES OF *LUCANUS CERVUS*, L.—Mr. HUGH MAIN exhibited an adaptation of his subterrarium containing larvae of *Lucanus cervus*, L., which allowed continuous observation of the metamorphoses of such wood-feeding Coleopterous larvae. Instead of using earth as was employed for subterranean larvae previously exhibited, damp oak sawdust as suggested by Mr. H. Willoughby Ellis, for rearing such insects, was used between two sheets of glass supported about an inch apart, in a zinc frame. Full-fed larvae when introduced, at once made oval chambers for pupation. A series of lantern slides illustrated the subsequent changes that were seen to take place in the larva, pupa, and imago till the latter reached its mature coloration. He suggested that the method might be usefully

employed for the detailed observation of this and other wood-feeding larvae, and that a comparison of the different parts of coleopterous pupae which became black before the disclosure of the imago might give valuable information bearing on the affinities of different families, genera and species.

SEX-RATIO OF *HYPOLIMNAS BOLINA*, L., IN VITI LEVU, FIJI.—Prof. POULTON said that he had just received a letter from Mr. Hubert W. Simmonds, confirming and extending the observations recorded by him and Mr. G. H. E. Hopkins in *Proc. Ent. Soc. Lond.*, i, pp. 29–31. The passage was as follows :—

“17 January, 1927: Suva, Viti Levu.

“*H. bolina* is now fairly numerous with plenty of males. I have counted as follows, but think females are really more abundant, as they do not haunt such conspicuous places.

	♂.	♀.
26.xii.26	7	8
27.xii.26	7	7
1.i.27	4	5
2.i.27	2	4
9.i.27	2	4
13.i.27	1	5
16.i.27	7	8
Total	30	41

“All females seem to belong to the common Viti Levu forms. I have families as follows :—

“A parent has yielded 7 pupae.

B „ all died.

C „ has yielded 10 pupae.

D „ has yielded a large family of larvae.

E „ infertile.

F „ has yielded many eggs.

G „ „ „ „ „

“The normal food-plant is *Synedrella nodiflora*, Gaertn. (Compositae), identified for me by W. Greenwood of Lautoka.

“18 January, 1927.—The first two *bolina* have emerged—one, a ♀, from Family A, and one, a ♂, from Family C. This is the first ♂ I have ever bred from a Viti Levu larva. I am now hoping that A will prove to be all-♀. I have to go away for a couple of weeks which will not help in getting these to pair, but I hope to have some luck.”

[A letter dated 15 February, 1927, contained the welcome information that Mr. Simmonds had solved the difficulty of mating *bolina*. Family D proved to be all females, two of which had paired with a captured male. Eighty-eight eggs had been laid by one of these females. Pairing took place readily in a large cage.]

SEX-RATIOS AND FORM-RATIOS IN EIGHT FAMILIES OF *ACRAEA ESEBRIA*, HEW., BRED BY DR. V. G. L. VAN SOMEREN AT NAIROBI, KENYA COLONY.—Prof. POULTON exhibited the parents and examples of all the forms obtained in seven families of

this most interesting series of breeding experiments. He felt sure that the Fellows would wish to congratulate Dr. V. van Someren on his results.

The forms which appeared in the families are shown in the list on p. 8, adopting the nomenclature and descriptions of Eltringham's monograph in *Trans. Ent. Soc. Lond.*, 1912, pp. 331-36.

Eight families of *Acraea esebria*, Hew., bred by Dr. V. G. L. van Someren from batches of eggs laid by known female parents at Nairobi, Kenya Colony.

Forms of female parents. All except H captured August, 1923.	Dates of emergence from pupa.	f. <i>jacksoni</i> , pattern varying.		f. <i>monteironis</i> .		f. <i>protea</i> , ♀ pattern.		f. <i>protea</i> , ♂ pattern. ♀ = <i>victoris</i> , n. ♀ f.		Proportions of the sexes emerging each day in each family.	
		♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
Parent A JACKSONI.	1923. Sept. 25	3	1				1			3	2
	„ 26	2	1				6	1	1	3	8
	„ 27						5	1		1	5
	„ 28						1	1		1	1
	Totals.	5	2				13	3	1	8	16
Parent B JACKSONI.	Sept. 25	2	4							2	4
	„ 26		2								2
	„ 27		1								1
	„ 28		4				1				5
	„ 30		1								1
	Totals.	2	12				1			2	13
Parent C JACKSONI.	Sept. 27						1	1		1	1
	„ 28						2				2
	„ 29								1		1
	Oct. 5							2	1	2	1
	Totals.						3	3	2	3	5
Parent D MONTEIRONIS.	Sept. 25	5						6		11	
	„ 26	3	2					5		8	2
	„ 27							1		1	
	„ 29							1	1	1	1
	Totals.	8	2					13	1	21	3

Forms of female parents. All except H captured August, 1923.	Dates of emergence from pupa.	f. <i>jacksoni</i> , pattern varying.		f. <i>monteironis</i> .		f. <i>protea</i> , ♀ pattern.		f. <i>protea</i> , ♂ pattern. ♀ = <i>victoris</i> , n. ♀ f.		Proportions of the sexes emerging each day in each family.	
		♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
Parent E MONTEIRONIS.	Sept. 29						2	1		1	2
	„ 30	2						2		4	
	Oct. 1							2		2	
	„ 2	5						7		12	
	„ 3	3	1				1	1		4	2
	„ 4						3		3		6
	„ 5	1	1					1		2	1
	Totals.	11	2				6	14	3	25	11
Parent F PROTEA.	Sept. 29							2	1	2	1
	„ 30						1	3		3	1
	Oct. 1						1	2	1	2	2
	„ 3						2		1		3
	„ 4								1		1
	„ 5						2		1		3
	„ 6		1				1				2
	Totals.		1				7	7	5	7	13
Parent G PROTEA.	Sept. 30							1		1	
	Oct. 1	2						2		4	
	„ 2	10	2					7		17	2
	„ 3	4	3				1	7		11	4
	„ 4	2					2			2	2
	„ 5	5	3		2		6	1	1	6	12
	„ 6	2	8		3		6	2		4	17
	„ 7	1	5		2		1			1	8
	Totals.	26	21		7		16	20	1	46	45
Parent H VICTORIS, n. ♀ f.	1924. Sept.	1	3		3		6	5		6	12

Jacksoni, E.M.Sh.—All markings tawny orange, and, in the typical form, the subapical band of F.W. joined by a narrow isthmus to the inner marginal patch. In the series tabulated below, the isthmus may be wanting, or, on the other hand, may be much wider than in the typical form. Both males and females of this form are present in the series.

Monteironis, Butl.—All markings white: the F.W. band always separated from the patch. Only females of this form in the series.

♀-*protea*, Trim. The female form (Eltringham: *ibid.*, p. 333) possesses a white F.W. band with all other markings pale creamy ochreous. Pattern that of *monteironis*. Only females of this form in the series.

♂-*protea*, Trim. Pattern resembling that of the female but F.W. subapical band narrower and all markings pale dull ochreous.

♀-*victoris*, n. ♀ f. Females resembling the above ♂-*protea* (but with the ochreous markings of a slightly paler tint) and differing from Trimen's ♀-*protea*, were bred in most of the families. It appears to be an unrecognised female form, and I propose for it the name *victoris* in honour of Dr. V. G. L. van Someren, who has done so much for East African and Uganda natural history.

Type from Family F in the Hope Collection, Oxford, with Paratypes from this and other families. Paratype from F in the British Museum.

The eight families are arranged in tabular form on pp. 6 and 7, the female parents of the same form being placed together and the order that of the relative abundance of the forms in the wild state as recorded by Dr. V. van Someren in the following note:—

"26 November, 1926.—The families are complete. In the wild state, the tawny orange forms [*jacksoni*] predominate; the black-and-white [*monteironis*] come next, while the other less numerous forms [*protea*-♀, *protea*-♂, and *victoris*-♀] are about equally represented."

Family H, already recorded in detail in *Proc. Internat. Ent.-Kongr.*, Zürich, 1925 (1926), ii, pp. 513–15, was included in the table for comparison with the other seven. This family was of special interest inasmuch as the female parent, which unfortunately escaped, "was of the uniform yellow var." (*ibid.*, pp. 513, 514) and therefore of the form *victoris*. The family having all emerged by 26 September, 1924 (p. 513), there could be no doubt that the eggs were laid in July or the beginning of August. The dwarf example of the f. *jacksoni*, inadvertently recorded as a female (p. 514), was correctly placed as a male in Family H in the table on p. 7.

The disproportion of the sexes in all families except G suggests the existence of an adaptation to encourage interbreeding with other families in a species with gregarious larvae.* Families B and D approach in disproportion, and therefore in the promotion of such interbreeding, the all-♀ families of *Acraea encedon*, L., bred by Lamborn in S. Nigeria (*Linn. Soc. Journ.—Zool.*, xxxii, p. 391: 1914). There is, however, this essential difference, that either sex may predominate in these mixed

* Such disproportion may be common in species with gregarious larvae. Thus, the late Dr. W. Hatchett Jackson wrote of *Vanessa io*:—"The friends who kindly accompanied me and helped me to collect the specimens took their supply from different colonies of caterpillars from those from which I took my own supply. Our several finds were kept in different boxes, and it was found subsequently that the individuals in the several boxes were principally, but not entirely, of one or of the other sex" (*Trans. Linn. Soc. Lond.*, 2nd Ser., Zool., vol. v, Pt. 4, 1890, p. 156).

families of *esebria*, whereas males predominated in the mixed families of *encedon*, a superiority balanced by the fact that the unisexual families were always all-♀.

The remarkably large Family G gave approximate equality of sexes—46 ♂ to 45 ♀—suggesting the possibility that comparatively short runs of inequality may succeed each other in the consecutively laid eggs of a female and that these inequalities may average out into equality in an exceptionally long run. Dr. V. van Someren wrote concerning Family G :—

“ 12 December, 1926.—Many thanks for working out proportions—they are very interesting, especially the sex-ratio. Fam. G was exceedingly large and, although I did not count the number, the data on the individual labels are correct. It is quite an exceptional brood and abnormal, I should say. One does on occasions obtain a gravid ♀ just overloaded as it were. Compare the *Papilio dardanus* families. I have a ♀ *dardanus* just now that has laid 120 eggs. It was taken *in cop.* and not disturbed until the pair separated.”

Dr. van Someren did not, I am sure, mean to imply in this note that any of the other families, with the possible exception of E, represented the total egg-laying capacity of the female parents, and therefore we are led to assume that batches of eggs were or might have been laid before or after, or before and after, those from which the larvae were raised. If this inference be accepted there is room for a succession of short runs with varying proportions.

Since the above paragraphs were written I have noted the sexes which emerged on each successive day in each family and recorded the results in the table. It will be observed that in the large Family G males preponderated in the earlier emergences and females in the later; so that if the eggs had been laid in two or four batches these would have a marked disproportion in the sexes, but laid as a whole the differences averaged out as suggested above.

It may be suggested that the predominance at first of males and then of females in G and other families is merely a result of the commonly observed tendency towards such a succession in Lepidoptera. This cannot be a complete solution, because the marked inequality in the numbers of the sexes of all the families (except the very small C and the very large G), which is certainly unusual, remains unexplained. It is to be noted that females preponderate in four and males in two (D and E) of the six families with marked inequality. I hope that it may be possible to obtain successive batches of eggs laid by the same female. Until this has been done we cannot reach safe conclusions. It will also be interesting to test by breeding whether the general distribution of the sexes in the batches is transmitted.

Acraea terpsichore rangatana, Eltr., is another species which should be observed from the same point of view. Out of 88 examples bred by Dr. V. van Someren from ova collected from the food-plant, no less than 66 are female. The presence of all-♀-breeding strains of female, like those of *encedon*, may be suspected.

These ova were collected in April, 1926, on Kinangop (8000–9000 ft.), in the Aberdare Range, Kenya Colony (*Journ. E. Afr. and Uganda Nat. Hist. Soc.*, No. 27, p. 213: Nov. 1926).

The relationship between the forms of *esebria* in the different families is interesting. Thus, *monteironis* is probably recessive to the others, being absent from six out of the eight families, including D and E with *monteironis* female parents.

Family C suggests that the *protea-victoris* forms (which nearly always occurred together in the families) may be dominant to *jacksoni*, but the numbers are too small to inspire confidence.

A NEW TAILED FEMALE FORM OF *PAPILIO DARDANUS HODSONI*, POULT., TAKEN BY MR. ARNOLD HODSON IN W. ABYSSINIA.—Prof. POULTON exhibited this beautiful form, captured at Gore (6600 ft.), W. Abyssinia, 14 December, 1926, together with four males of *P. d. hodsoni*, taken below Gore (6000 ft.), two on 10 December, and one each on 15 and 16 December, 1926. The female form, which combined the patterns of *salaami* and *cenea* with a peculiar colouring, was described below :—

P. d. hodsoni, **wienholti**, ♀-f. n.—The upper surface of the fore-wing bears the pattern of the E. African ♀-f. *trophonius*, Westw., or more nearly that of *salaami*, Suff., because the oblique subapical band, as well as the other markings, is tawny orange. The hind-wing upper surface pattern is that of the ♀-f. *cenea*, Stoll, but the basal patch and submarginal spots are tawny orange. The tails, which are about half the length of the male's, are deep black, like the ground-colour of both wings.

The colour of the upper surface markings is not the tawny orange of *trophonius*, *salaami*, and other forms. It is more golden and can best be defined as a deep chrome, similar to that of the F.W. markings of the *leighi*, Poul., ♀-f., from Natal. The depth of this colour varies in different parts of the pattern. The lightest shade, darkening towards vein 6, is seen in area 6 of H.W.; next to this is the oval mark in area 2 of F.W.; then the basal patch of H.W. below vein 6; then the markings in areas 1a and 1b of F.W.; the deepest chrome being found in the remaining F.W. markings—the submarginal spots and subapical spot, the spots in areas 3, 4, 5 and the detached spot in 7 forming together the oblique band, the spot in the cell, which is constricted, especially on the left side, but not quite divided into two. The submarginal double spots of H.W. are an equally deep chrome, obscured by a sprinkling of black scales, least developed in area 6, then in 5 and 4, in that order. The fringe in the concavities of the undulating margin of H.W. is also of the deepest shade; similarly in the F.W. where the concavities are slightly marked and the chrome-tinted sections of fringe very small and absent on the apical side of area 5 where the colour is a mere point. The successive changes in the depth of the chrome markings, distinguished in this paragraph, are very slight, although there is a marked difference between the darkest and the lightest shade.

The greater part of the under surface is ochreous orange, giving to the insect a very distinctive appearance, especially in the position of rest when the black of the F.W. would be hidden by the H.W. and no tint but orange would be visible, except the olive-brown discal band of H.W. The palest orange is that of the inner marginal F.W. markings in areas 1a, 1b; next, that of the basal patch of H.W. and the apical section of F.W. which latter becomes paler proximally. On this area of F.W. the apical markings of the upper surface reappear, being of a paler ochreous orange than the surrounding surface. The F.W. cell, except for the ochreous orange mark, is intense black, invading the bases of the surrounding areas and prolonged distally to a greater and greater extent in this order :—area 6 (least invasion), 4, 2, 3; in these last two reaching and partially surrounding the submarginal spot. A narrow black border also surrounds the distal extremity of the orange marking in area 1b and

slightly invades 1a. The black-surrounded border of the markings in areas 1a, 1b, and 2 is very dyslegnic, as also on the upper surface, and the same applies to the distal border of the H.W. basal patch, above and below. It has already been mentioned that the ochreous-orange of H.W. is interrupted by an olive-brown discal band. This broad and important feature evidently represents the interrupted black discal band of the male upper and under surface, for it bears irregular marks of a darker shade of brown, corresponding with some of the male components. Distally the olive-brown becomes paler and orange-tinted, passing into the broad ochreous-orange margin which extends into the tails. The three longitudinal streaks in the H.W. cell are dark brown and very distinct on the under surface.

The body is coloured like that of other orange-marked female forms, but, like the wing-markings, is of a more golden shade.

Type in the Hope Collection, Oxford.

This hitherto unique form is named after its discoverer Mr. Arnold Wienholt Hodson, C.M.G.

Upon the wing this female form would probably roughly resemble the Abyssinian race of *Planema epaea*—*P. e. homochroa*, Rothsch., and of *Planema tellus*.

EVIDENCE OF ATTACK, PROBABLY BY A BIRD, ON THE NYMPHALINE BUTTERFLY *EUXANTHE TIBERIUS*, GR.-SM., IN E. AFRICA.—Prof. POULTON exhibited the fore-wings of a female *E. tiberius* found by Mr. A. Loveridge, lying on a path and in the herbage beside it, in rain-forest at Bagilo, Uluguru Mts., Tang. Terr., 24 September, 1926. The hind-wings, which were not collected, were also present, snipped off as neatly as the others. A mark such as would have been made by the tip of a bird's bill, was distinct on the left fore-wing and probably indicated the nature of the attack. It was interesting to compare this evidence of attack with that obtained by Dr. S. A. Neave—a female of the Uganda race of *Euxanthe trajanus*, Ward (nearly allied to *E. tiberius*), bearing the beautifully distinct impress of a long narrow beak (*Proc. Ent. Soc. Lond.*, 1924, pp. cxl, cxlv).

INJURY SEEN TO BE INFLICTED ON THE ♀-F. *TROPHONIUS*, WESTW., OF *PAPILIO DARDANUS CENEAE*, STOLL, AT DURBAN.—Prof. POULTON exhibited the *trophonius* female referred to by Mr. G. F. Leigh in the following note:—

“12 May, 1924.—This specimen which I had been following for some distance in a narrow glade, thinking what fine condition it was in, was suddenly seized by a bird (a Fret*), with the result you see. These birds are very numerous this season. They settle at the edge of the bush on one side of the glade, flying out after and generally capturing butterflies which they carry off to devour in the bush on the other side. This bird must have been very sharp to distinguish between the *trophonius* and *Danaida chrysippus* which was common at the time.”

The injury was one commonly seen in butterflies, the anal section of both hind-wings being symmetrically shorn through, as if with scissors. A similar injury was seen by Mr. F. Muir to be inflicted by a bird upon *Salamis nebulosa*, Trim., also at Durban (*Proc. Ent. Soc. Lond.*, 1913, pp. xxi, xxii). A good example of this type

* Dr. G. A. K. Marshall has kindly informed me that the local name “Fret” probably refers to the Paradise Flycatcher (*Terpsiphone perspicillata*, Swains.), which has been more than once observed to attack butterflies (*Trans. Ent. Soc. Lond.*, 1902, pp. 354, 357).

of injury, collected by Dr. G. A. K. Marshall, C.M.G., F.R.S., is represented in *Trans. Ent. Soc. Lond.*, 1902, pl. xi, fig. 9.

BRITISH BIRDS ATTACKING BUTTERFLIES.—Prof. POULTON exhibited three wings of *Aglaia urticae*, L., illustrating the following note by Mr. J. A. Simes :—

“On 17 September, 1926, at Sandown, I.W., I saw a Pied Wagtail with a butterfly in its bill and watched it remove the wings by beating the insect against the ground, and then swallow the body. I subsequently found the two fore-wings and part of a hind-wing of the butterfly, the rest having been lost owing to a high wind.”

Mr. Simes had also observed two unsuccessful attempts made by birds :—

“On 25 July, 1926, at Loughton, Essex, I saw a Whitethroat endeavour to catch a *Pyrameis cardui*, L., on the wing. It failed in the attempt.

“On 13 September, 1926, a Swallow swooped at a *P. cardui* which was flying along the foreshore at Sandown, I.W. It did not capture the butterfly and made no further attempt.”

W. A. LAMBORN'S OBSERVATIONS ON THE PREY OF AN ASILID FLY IN NYASALAND.—Prof. POULTON exhibited the following examples of *Alcimus rubiginosus*, Gerst., with their prey, taken in rather thick bush country by Mr. Lamborn at Maiwale (3200 ft.), 12 m. E. of Fort Johnston, Nyasaland :—

Asilid captor.	Date in 1926.	Prey.
1. <i>Alcimus rubiginosus</i> , ♀	November 26	The Acridian, <i>Machaerocera</i> sp., ♀.
2. " " ♀	" 29	The Dipteron, <i>Bombylius analis</i> , F., ♂.
3. " " ♀	December 5	The Lycaenid, <i>Tarucus telicanus</i> , Lang, ♂.
4. " " ♀	" 7	The Dipteron, <i>Eristalodes taeniops</i> , Wied., ♀.
5. " " ♂	" 7	The Nymphaline butterfly <i>Precis cuama</i> , Hew., dry f. <i>cuama</i> , ♀.

Mr. Lamborn also took a pair of this beautiful Asilid *in cop.*, in the same locality on 11 November, 1926. The preferences of *Alcimus rubiginosus* might be compared with those of the three S. African species of the same genus recorded in *Trans. Ent. Soc.*, 1906 (1907), pp. 345–46. In this paper fifteen *Alcimus* were shown to have taken thirteen Lepidoptera and two Acridians, but not a single Dipteron.

A note sent with Mr. Lamborn's No. 3 stated that the butterfly was seen to be captured, and continued—"the Asilid, held carelessly, pierced my finger, drawing blood." Mr. J. C. F. Fryer has recorded the same experience in *Proc. Zool. Soc.*, 1913, p. 618, where several interesting observations on the Cingalese Asilids and their prey were published. The following sentence appeared under 8 August, 1912—"a slight bite from an Asilid was most painful, and felt as if poisonous matter had been injected." Mr. Fryer had also kindly added the following note :—"I distinctly remember two other bites, but evidently, as I had not noted details as to date, etc., I did not record the observation in the paper in *Proc. Zool. Soc.*

To the best of my recollection, however, the results on the two subsequent occasions were similar to those in the one recorded, and I am quite certain that the observations were made at the same place—Maha Illupalama, in the North Central Province of Ceylon.”

The small number of records appeared to show that the ASILIDAE only rarely made use of their formidable weapon for the purpose of defence, in this respect contrasting sharply with the Aculeates and some of the Hemiptera.

BRITISH ASILID FLIES AND THEIR PREY.—Prof. POULTON exhibited the following three Asilid captors with their prey, taken by Mr. H. W. Andrews, and, except the *Dysmachus*, recorded by him in *The Entomologist's Record*, xxxviii, 1926, p. 159. The published data were now repeated with some amplification and the correction of inadvertent errors.

Dysmachus trigonus, Mg., ♀, with the Dipteron *Oedoparea buccata*, Flin., ♂ (PHYCOTRIDIÆ), Littlehampton, 23.vi.1924.

Eutolmus rufibarbis, Mg., ♀, with the Dipteron *Thereva nobilitata*, F., ♂, or more probably as Mr. F. W. Edwards thinks, *T. plebeia*, L. (THEREVIDÆ), near Farningham, N. Kent, 1.viii.1925. The uncertainty in the determination was due to the condition of the specimen. This Asilid occurred “in one small locality in an open bracken-covered space in a wood, and the specimens with prey were taken resting on the fern.” Mr. Andrews had not seen this species with any other prey. Two examples were mentioned in the *Record* (l.c.).

Asilus crabroniformis, L., ♀, with the “Burying Beetle” *Necrophorus vespillo*, L., about midway between Swanley and Farningham, 22.viii.1926.

The last-named conspicuous and, in some localities, abundant Asilid was not often observed with prey. Of the eight examples recorded in *Trans. Ent. Soc. Lond.*, 1906 (1907), pp. 348, 349, four were Dipterous, three Orthopterous and one Coleopterous. The last victim was very “small deer” for such a magnificent captor, being the little Galerucid *Sermyla halensis*, L. The exhibited *Necrophorus*, on the contrary, must have been a heavy load, even for this powerful Asilid. The circumstances of its capture were also unusual, as would be realised from the following note kindly written by Mr. Andrews:—

“My impression is that the beetle was alive when the specimens were taken. I was working specially for *crabroniformis* at the time, for it was the first occasion (with one solitary exception) on which I had come across the species in the North Kent district. I had caught some half-dozen specimens settled on the paths in a clover field, and if the Asilid had been flying with its prey I think I should have noticed it. As it was, my attention was drawn to a scuffle at the edge of the path, and I clapped my net down sharply over the insects. This usually resulted in the Asilid promptly flying up into the net, but in this particular instance the insects still remained on the ground and I boxed instead of bottling them. They separated as soon as they were in the box, but the beetle appeared then to be dead.”

A fifth example of *A. crabroniformis* with Dipterous prey, *Tipula paludosa*, Mg., taken at Twitchen, Mortehoe, N. Devon., by the late Dr. G. B. Longstaff, 15 September, 1907, and presented to the Hope Collection, was also exhibited to the meeting. Both captor and victim were females. In addition to the above, Mr. B. M. Hobby, of The Queen's College, Oxford, had called attention to the capture by

Mr. F. J. Killington of a female *crabroniformis* * with the grasshopper *Gomphocerus maculatus*, Thunb., on the heath at Beaulieu Road, 25 July, 1925 (*Trans. Hampshire Ent. Soc.*, No. 2, 1925-26, p. 8). Mr. Killington had recently kindly supplied the information that the Asilid was taken on the wing carrying this very considerable load, and that the prey was still alive but unable to stand when dropped by its captor.

These examples of *crabroniformis* with their victims add one each to the three categories of prey recorded in 1907 (l.c.), *Gomphocerus maculatus* accounting for two out of the four Orthoptera—all ACRIDIDAE. The sex of the Asilid was unknown in five out of the eight previous records, the remaining three as well as those now published being females.

In the determination of the Diptera, Orthoptera and Coleoptera mentioned in this and the preceding communication kind help was given by Major E. E. Austen, D.S.O., Mr. F. W. Edwards, Miss Ricardo, Mr. B. P. Uvarov, and Commander J. J. Walker, M.A.

A DRAGON-FLY CAPTURED BY ANOTHER AND LARGER SPECIES.—Prof. POULTON exhibited the captor and victim, kindly presented to the Hope Collection by Mr. J. A. Simes who had written the following account of his observations :—

“On 18 June, 1925, about 3.30 p.m., at Samoussy, Aisne, France, I saw a large dragon-fly (*Aeschna juncea*, L.) flying about, clasping an example of a smaller species (*Libellula quadrimaculata*, L.). It presently alighted on a rush, and I then saw that the aggressor had its victim clasped by its first and second pairs of legs, the third pair being employed holding on to the rush. The insects were placed head to head and ventral surface to ventral surface, and, as I watched them, the large dragon-fly began to eat the smaller, commencing its meal with the victim's eyes. At this stage I caught the pair.”

The species had been kindly determined by Mr. W. J. Lucas.

Dr. H. ELTRINGHAM gave an account, with lantern illustrations, of his paper on the brush organs in the Noctuid moth *Laphygma frugiperda*, Sm. & Abb.

Papers.

The following papers were read :—

1. “A preliminary account of the Life-history of *Coccinella 11-punctata*,” by Mrs. O. A. MERRITT-HAWKES, M.Sc., and Mr. T. F. MARRINER.
2. “Studies in the mating habits and oviposition in *Anacridium aegyptium*, L. (Orthoptera, Acrididae),” by S. M. FEDEROV. (Communicated by Mr. B. P. UVAROV.)
3. “Further notes on *Anomoses* (Lep. Homoneura),” by Dr. A. JEFFERIES TURNER.
4. “The Liquid-squirting habit of Oriental Grasshoppers,” by Major R. W. G. HINGSTON, I.M.S.
5. “On the African species of the genus *Mesochorus* (Fam. Ichneumonidae),” by Capt. D. S. WILKINSON.
6. “On the South African species of *Nanophyes* (Col. Curculionidae) and some allied genera,” by Dr. G. A. K. MARSHALL, C.M.G., F.R.S.

* Kindly presented to the Hope Collection by Mr. Killington.

7. "Descriptions de Cercopides nouveau provenant de la Collection du British Museum," by M. le Dr. LALLEMAND. (Communicated by Mr. N. D. RILEY.)

8. "The Rhopalocera of the Third Mt. Everest Expedition," by Mr. N. D. RILEY.

9. "A new genus and species of the Strepsiptera from S. India, *Indoxenus membraciphaga*, gen. et sp. nov.," by Mr. SUBRAMANIAN. (Communicated by Dr. G. A. K. MARSHALL, C.M.G., F.R.S.)

10. "Insect Remains from Oil Sand in Trinidad," by Mr. K. G. BLAIR, B.Sc.

11. "On the brush organs in the Noctuid Moth, *Laphygma frugiperda*, Sm. & Abb.," by Dr. H. ELTRINGHAM, M.A.

Wednesday, March 16th, 1927.

Mr. J. E. COLLIN, President, in the Chair.

Election of Fellows.

The following were elected Fellows of the Society:—R. R. ARMSTRONG, B.A., M.D., B.Ch., 6 Castlenau Gardens, Barnes, S.W. 13; R. ATTIA, A.R.C.S., B.Sc., The Royal College of Science, South Kensington, S.W. 7; B. EMBRY, St. Bartholomew's Vicarage, Dover, Kent; J. D. GUNDER, 849, Linda Vista Avenue, Pasadena, California, U.S.A.; H. JANSON, 44, Great Russell Street, W.C. 1; F. A. LABOUCHÈRE, 15, Draycott Avenue, Chelsea, S. W.; J. E. M. MELLOR, Plant Protection Section, Ministry of Agriculture, Cairo, Egypt; A. TOWNSEND, Leam Grange, Warwick New Road, Leamington Spa.

Exhibits.

MONGREL RACES OF *DIACRISIA MENDICA*, CLERCK.—Mr. ROBERT ADKIN exhibited the series referred to in the following note which he read:—

It is well known that *D. mendica* has two forms of the male, of which the typical one is sooty-brown in colour and occurs in England and over a large part of the Continent of Europe; and the race *rustica* in which the male is almost white and which occurs in Ireland and some restricted continental areas; there is no difference in the females of the two races, they being white in both.

So long ago as 1886 I received some ova of *rustica* from County Cork, also of some typical *mendica* of English origin; both broods were kept going in the hope of getting a cross pairing, but I was not successful in this until 1889. By this time both broods were somewhat badly diseased, but I succeeded in obtaining a pairing between a male *rustica* and a female *mendica* and, although a considerable batch of ova was produced, only four of them hatched, and in the result two males were bred in 1890; both of them were of a sandy-brown colour, as near as possible intermediate between the two races.

At about this time Standfuss in Germany and his friend Caradja in Italy were experimenting on similar lines to the above, their stock of *rustica* being obtained from the Grisons and from Rumania.

In 1894 Standfuss obtained pairings between male *rustica* and female *mendica*, and he tells us that although he had about 1000 larvae they all died from disease

when they were nearly full fed. He, however, received some healthy pupae from Caradja, from which he reared 17 males and 14 females ; and of the former he says 2 were almost as light as *rustica*, 12 intermediate and 3 almost but not quite so dark as *mendica*. The females he described as uncharacteristic.

It was not until 1924 that I had an opportunity of repeating my experiments. I then obtained fresh stocks of *mendica* from Suffolk and of *rustica* from King's County and from County Cork, and in the following year had no difficulty in obtaining cross pairings. From a pairing between a King's County male *rustica* and a female *mendica*, a brood of 94 males and 103 females resulted. The males varied in colour from practically as white as the male parent to almost, but not quite, as dark as typical *mendica*, but the numbers of these extremes in either direction were very small, the greater number being of varying shades between them. But in about 70% of the males there was a character that was not observable in either of the parents, nor indeed in any of the broods from which they were taken, namely, a broad pale stripe along the costa, and a narrow line from the base of the middle of the fore-wing of the same colour. The brood from a pairing between a County Cork male *rustica* and a female *mendica* did not fare so well, only 45 males and 73 females being reared. These males were more generally intermediate in colour, none being nearly so light as the parent, and although the character just mentioned was discernible in several of them, it was in none of them so strongly pronounced as in some of the King's County brood. The whole of the females of both broods were quite typical.

THE EDUCATION OF BIRDS AND ITS BEARING ON THE WARNING AND MIMETIC COLOURS OF INSECTS.—Prof. POULTON said that he had received the following letter on this interesting subject from his friend Mr. Champion B. Russell :—

“ 20 February, 1927 : *Stubbers, North Ockenden, Essex.*

“ I don't know if I ever told you of our experience here with *Aucuba* berries and birds. It occurs to me that it has a bearing on butterfly mimicry. For many years we had here spotted *Aucuba* bushes—all female plants. My father heard that the males had been imported and got some plants,—result a fine crop of bright red berries ; but the birds stripped them off *at once*. I suppose they tasted nasty, for the ground underneath was strewn with the berries. After an interval of a year or two I woke to the fact that the birds no longer touched the berries, which were conspicuous on the bushes all through the season. So far as I know they have never been touched since !

“ Whatever be the explanation (? inherited memory) the birds probably avoid anything that looks like an object that tasted very nasty to their grandfathers !

“ Really birds are sometimes very unventuresome in testing strange food. I was told and believe that parrots in Natal did not discover that the apple was ‘ a tree to be desired ’ until about 1900, when doubtless an Eve among the parrots found it out and passed it on to her husband and everyone else.

“ In N. Rhodesia at Chitumbi Mission, they had an experimental plot of excellent wheat, and not a bird seemed to have found out that it was worth pecking ! They are better educated in S. Rhodesia, according to the Government agricultural pamphlets.

"I remember when our railway line was first opened, lots of rabbits and a good many hares were killed, but after a few weeks there was a total absence of casualties from trains, and later generations seem to avoid them all right.

"I fancy that the bird's point of view and 'the state of life it has been called to' may have an important bearing on the development of mimetic resemblance in colouring, flight, etc."

It was probable that the interesting behaviour of the birds towards the Aucuba berries was to be explained by large numbers following the example of the first enterprising experimenters upon some "new thing," and a general experience of the unpleasant result. This would probably be followed by the passing on of this experience by education of the young. An important element in the situation was probably the *sudden* appearance for the first time, and on a large scale, of berries resembling others known to be attractive. Later experiments, if any were conducted, would doubtless be made singly and attract little attention. The berries had ceased to be novel and surprising objects.

DIPLOSTICHUS JANITRIX, HARTIG, A TACHINID PARASITE OF THE PINE SAWFLY, AND ITS METHOD OF EMERGENCE.—Mr. J. C. ROBBINS exhibited a specimen of the Tachinid, *Diplostichus janitrix*, Hartig, that had emerged from a cocoon of the pine sawfly, *Diprion (Lophyrus) pini*, L., together with the cocoon containing its puparium and, for comparison, cocoons of *D. pini* from which the sawflies had emerged and others from which the sawflies had failed to emerge, and communicated the following note :—

"On 25 July, 1925, Mr. H. J. Burkill sent me a larva of the pine sawfly, *Diprion (Lophyrus) pini*, L., which he took on the trunk of a pine (*Pinus sylvestris*) at Esher, Surrey; on the same day the larva spun a cocoon of normal appearance. About 14 July, 1926, a female Tachinid fly emerged, which Mr. J. E. Collin has kindly identified as *Diplostichus janitrix*, Hartig. This fly emerged from the sawfly cocoon through a perfectly circular hole at one end, with a 'lid' that remained attached to the cocoon at one point. The hole through which the parasite emerged was, in fact, almost exactly similar to that normally made by the sawfly, except that it was somewhat smaller.

"The only means that a Tachinid imago has of emerging from the cocoon or cell that encloses it consists of pressing against the confining wall by inflating its ptilinum, or frontal bladder. This process was actually observed in Nigeria by W. A. Lamborn in the case of a species that parasitises a mud wasp, *Eumenes maxillosa*, De G., from the cells of which the imagines emerge (*Proc. Ent. Soc. Lond.*, 1914, pp. xli-xlii). It is quite evident that even if the Tachinid had the strength to break through the hard, tough cocoon of a pine sawfly unaided, it would not make a regular circular hole with an edge that appears to have been cut. It is therefore certain that the emergence hole must have been prepared, either by the sawfly larva before its death or by the parasite larva before its pupation, by cutting a circular groove round the inside of the cocoon at one end, so that only a thin outer layer remained to be severed by the fly on emergence. That such a groove is not cut by unparasitised larvae of *Diprion pini* I was able to ascertain through the kindness of Dr. R. C. L. Perkins, who sent me a number of cocoons of this species from which the sawflies had failed to

emerge. None of these cocoons, which contained dead larvae or pre-pupae, and in one case a dead imago, of the sawfly, showed any weakness or sign of preparation for emergence, and I think there can be little doubt that, as Hartig states (*Blatt- u. Holzwespen*, p. 104; Berlin, 1837), the hole through which the sawfly emerges is cut by the imago with its mandibles, probably in the manner described by Dr. T. A. Chapman for *Trichiosoma tibiale*, Steph. (*Ent. Mo. Mag.*, liv, pp. 11-13; London, January 1918).

"The possibility that the parasitising of the sawfly larva should cause it to cut a groove round the end of the cocoon, may, I think, be dismissed, and the only remaining possibility is that the groove is cut by the parasite larva before pupating, which is, I am convinced, the correct explanation. A close examination of the edge of the 'lid' of the emergence hole, and the cut edge of the cocoon, internally, shows that there is round each a slight ridge of material resembling fine sawdust that has been made damp so that the particles cohere, suggesting that the cocoon is moistened by the fly larva before it cuts the groove. Similar ridges, composed of larger particles, surround the edges of the emergence holes and 'lids' cut by the sawflies.

"Hartig, who first described *Diplostichus janitrix*, described at the same time the mechanism of the emergence of the imago (*Jahresber. über die Fortschritte der Forstwiss. im Jahre 1836 u. 1837*, i, H. 1, pp. 279-280; Berlin, 1838). This paper cannot, apparently, be seen in any London library, but I am able to give a translation of the part dealing with the point in question, through the kindness of Dr. H. Prell, of Tharandt, Saxony, who sent me an extract: 'Larvae of *Lophyrus* [*Diprion*] *frutetorum*, F., that harbour maggots of *Tachina janitrix*, which, like *T. inclusa* and *T. simulans* [*Ceromasia* (*Tachina*) *inclusa*, Htg. (= *simulans*, Htg.)], pupate inside the cocoons, complete their cocoons as usual, equally compact and tough all over, but afterwards cut off a small circular lid at one end, which, however, remains in its position attached by the outermost threads. The maggot pupates in such a way that the head end of the puparium lies immediately under the cut lid. As the adult fly breaks its puparium open, it also tears the silk threads that hold the lid in place; this springs open, but remains attached to the cocoon as though by a small hinge, and the fly escapes. In this case, there is, however, the possibility that the entire preparation has been made by the maggot before pupating. The horny mouth-hooks, usually maxilla-like, are possibly, in the larva of this fly, which has not yet been studied, larger than usual and suited for the cutting of the lid. But, if one considers the two previous cases [*Ceromasia inclusa*, Htg. (and *C. simulans*, Htg.) the larva of which, by checking the spinning of the host larva (as Dr. Prell believes), causes the latter to spin a cocoon with the wall thin and loose at one end, so that the parasite imago can emerge], in which the preparation for the emergence and safety of the parasite depends absolutely on the host caterpillar, then in the last case this is more likely.' Hartig then goes on to discuss the explanation of this, and ascribes it to 'an animal capability . . . far surpassing the ideas that we combine in the word instinct.' Recently, however, in a paper on the emergence of insects (particularly parasites) from apparently unsuitable cocoons, Dr. Prell has described the emergence of *Diplostichus janitrix* from the cocoon of its host in the manner that I have indicated above (*Zool. Anz.*, lix, pp. 249-250, 1 fig.; Leipzig, 1923).

"According to Prell (*loc. cit.*) and Stein (*Arch. Naturg.*, xc, Abt. A, H. 6, p. 107, Berlin 1924), *D. janitrix* is rare on the Continent. So far as I am aware there is no published record of its occurrence in Britain, but Mr. Collin has informed me that he possesses three specimens from Camberley, Surrey, bred from *Diprion* (*Lophyrus*) sp. by Mr. E. E. Green, and that Mr. C. J. Wainwright has two specimens bred by Mr. G. T. Lyle from *D. pini* from the New Forest, while there is one in the Cambridge University Museum taken in the New Forest by the late Dr. Sharp."

THE BRITISH SPECIES OF *NEURIGONA*.—The PRESIDENT exhibited specimens of the British species of *Neurigona* (DOLICHOPODIDAE) including a male of *N. abdominalis*, Fln. (new to the British List), taken by himself at Kirtling (Cams.) on 13 June, 1926, and communicated the following note:—

"*Neurigona abdominalis* may be distinguished from the other British species having greyish instead of yellow thorax (*N. quadrifasciata* and *N. suturalis*), by the absence of basal dark bands to the abdominal tergites. The third and fourth joints of the male front tarsi are not plumed as in *quadrifasciata* and the crossvein between discal and postical veins is near the middle of the wing, while it is considerably beyond the middle in *suturalis*. The last joint of male front tarsi bears on the front side except near the tip numerous short stubby black bristles, and the front claw is enlarged while the hind claw is very small. In *suturalis* the stubby black bristles are absent and the difference in the size of the claws (or ungues) is less marked, while it is the *hind* claw which is somewhat larger and of different shape.

"The occurrence of this species in England is an interesting addition to our knowledge of its distribution, for it has previously been recorded from only Central Sweden and Denmark.

"*N. abdominalis* is the fourth known British species of the genus, for *N. erichsoni* which was recorded as British by Walker from specimens in the Curtis and Clifton Collections appears to have little right to remain in the 'List.' The specimen in the Clifton Collection at the British Museum under the name of *Porphyrops erichsoni* is certainly only a female of *quadrifasciata*."

Major R. W. G. HINGSTON gave an account, illustrated with lantern slides, of protective devices in spiders' nests.

Wednesday, April 6th, 1927.

Mr. J. E. COLLIN, President, in the Chair.

Election of Fellows.

The following were elected Fellows of the Society:—F. W. BEENEY, The Old College, Windermere, Westmoreland; C. N. HAWKINS, 23, Dalebury Road, Upper Tooting, S.W. 17; R. S. HOLE, Bury Orchard, Wells, Somerset; A. R. LEIVERS, 20, Warwick Road, Mapperley Park, Nottingham; H. W. B. MOORE, Plan Albion, Berbice, British Guiana; J. E. H. ROBERTS, O.B.E., M.B., B.S., 26, Harley Street, W. 1.

Exhibits.

EARLY STAGES OF *CASTNIA EUDESMIA*.—Mr. W. F. H. ROSENBERG exhibited cocoons with empty pupa-cases of *Castnia eudemia*, Gray, with a bored stem of the food-plant (*Puya chilensis*, Moline : Bromeliaceae) and both sexes of the adult moth from Chili.

He said that in a paper by Dr. A. G. Butler on "Heterocerous Lepidoptera collected in Chili by Thomas Edmonds, Esq.," there occurs the following note :—

"Common near Valparaiso, but very difficult to capture in the perfect state. The larva feeds in the interior of the stems of a species of *Bromelia*, and the pupa-cases may be found with the ends sticking out of the stems between the leaves in the months of October and November. The cases, or cocoons, vary from 5 inches to 9 or 10 inches in length (the female being largest), are composed of chewed wood of the plant and silk, and are beautifully lined with silk on the inside. The pupa has the power of wriggling from end to end of the cocoon.

"The imagines emerge end of December and in January and fly very swiftly by day. The food-plant has long sword-shaped leaves, with sharp hooked prickles on the edges, and bears a stalk 8 or 10 feet high, with pale yellow flowers."—Thomas Edmonds.

A TERATOLOGICAL SPECIMEN OF *MELANITIS LEDA* FROM FORMOSA.—Dr. K. JORDAN exhibited a male of this Satyrine, which has two fully developed abdomina. The additional abdomen projects from between the mid- and hindlegs and arises from the mesosternite behind the left coxa. It is sharply bent to the right at the base and then backwards. The accompanying sketches will make its position clear. The genital armature is the same in both abdomina. Fig. 1 represents a view from the underside; Ab¹ = normal abdomen, Ab² = additional abdomen. Fig. 2 is a view from the left side; Mc and Hc = mid and hind coxae.

A NEW BRITISH PYRALID, *SCHOENOBIVS DOTATELLUS*, WALK.—Mr. H. M. EDELSTEN exhibited a ♀ specimen of this Indian Pyralid which he had taken in East Sussex marshes on Aug. 30, 1924. It came to light together with several males and was also noticed sitting about on rushes. It was at first thought to be *Schoenobius forficellus*. The males were unfortunately lost. The locality has been visited again each year, but the weather on each occasion was unfavourable, and nothing was seen. Several visits were paid during June and July in an endeavour to find the larvae and also to see if there was an earlier appearance of the imago, but without success. The specimen has been identified by Dr. Jordan and Mr. W. H. Tams.

EXAMPLES OF MELANISM IN LEPIDOPTERA.—Mr. W. MANSBRIDGE exhibited *Aplecta nebulosa*, Hufn., *Boarmia repandata*, L., and *Selenia bilunaria*, Esp., to illustrate his experimental work in the production of melanism; lantern slides of the moths obtained as the result were also shown in order to facilitate description.

A. nebulosa.—Several experimenters have found that when the well-known melanic variety *robsoni* has been paired, the parents having been obtained from wild larvae, the invariable result has been 25 per cent. *type*, 50 per cent. *robsoni*, and 25 per cent. *thompsoni*, the last being a melanic form distinguished from *robsoni*

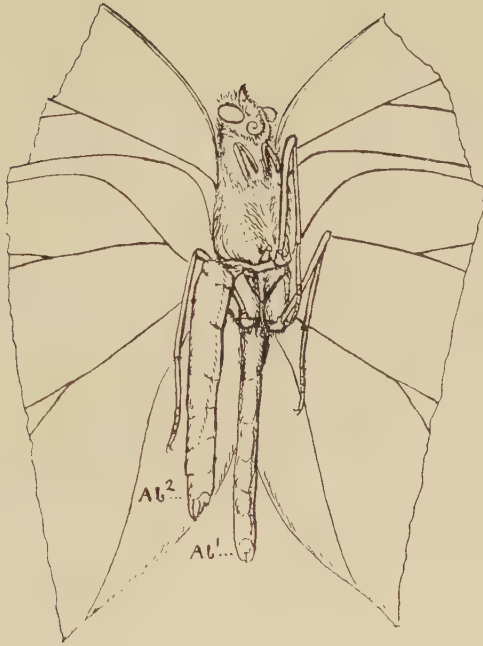


FIG. 1.

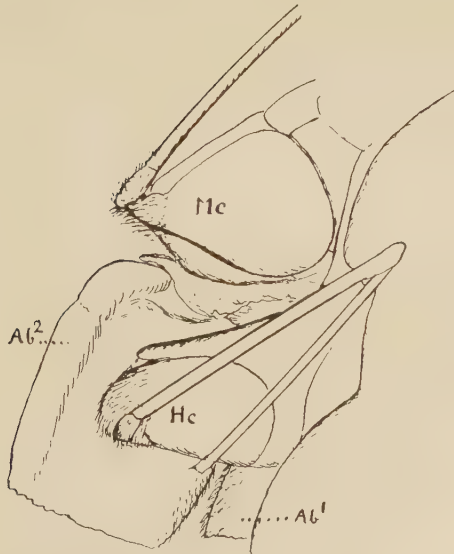


FIG. 2.

by white fringes and narrow white border to the termen of the fore-wings. This was amply confirmed by the present series of experiments. The grey type forms have been found to breed true whenever trials have been made, and there appears to be no doubt that *thompsoni* is homozygous for blackness, that *robsoni* is heterozygous and that the melanism is dominant.

At Delamere Forest in Cheshire the typical forms of *nebulosa* vary from pale grey to dark fuscous ground-colour, the extremes being evenly connected by intermediates; the extremes, however, are rare. Experimental pairings of the very dark typical variations were made in 1915-16-17-18, with the result in each case that *robsoni* appeared together with a form described as var. *plumbosa* (Entom., L., p. 50) as follows:—25 per cent. ordinary pale type, 50 per cent. *robsoni*, and 25 per cent. *plumbosa*, the outstanding feature here being the appearance from parents with typical markings of the definitely melanic aberration *robsoni*: it follows from this that if *robsoni* always gives the result stated above we have a clue to the genesis of melanism in nature.

It is unfortunate that although in *nebulosa* the melanism behaves as a Mendelian dominant, the black variations are difficult to breed as an F₂ generation in confinement, many trials have been made which have failed completely or the number of imagines yielded has been quite inadequate to use as evidence in an inquiry regarding inheritance in Mendelian proportions.

Boarmia repandata.—This widely distributed and abundant moth was represented by eight generations, starting with a wild black female var. *nigra*. The results showed melanism to be dominant, but in this instance the black homozygote is indistinguishable in appearance from the heterozygote; owing to this, it was not until the F₆ generation that pairings of the black homozygote were obtained, they were taken on to the F₈ generation breeding perfectly true, ova subsequently yielded were infertile. Types were extracted from several generations before the F₆, and some were carried on for four generations, all bred perfectly true.

As in the case of *A. nebulosa* the Delamere forms of *repandata* vary from the pale grey types to those with dark fuscous ground-colour; an experiment with two selected very dark moths gave 15 types and one var. *nigra*, it therefore seems probable that the same process is in operation in both instances.

Sclenia bilunaria.—In April 1909 a female was captured in Delamere Forest and four generations of the moth were bred; the darkest individuals in each generation being selected for pairing. The F₄ generation was remarkable for the fact that five specimens in a total of about thirty showed a strong tendency to melanism and two others were almost as dark. Fertile ova were obtained from them, but as no food was available for the young larvae they died. So far as known, this melanic variation has not been found in nature. Particular interest attaches to this result as Dr. F. C. Garrett and Dr. Harrison in a paper communicated to the Royal Society (*Proc. Roy. Soc.*, B, Vol. 99, 1926) claim to have produced the same variation from typical parents by feeding the larvae with food impregnated with manganese sulphate; however that may be, it is certainly open to question whether chemical contamination is a direct cause of melanism in nature. Farther experiments are being carried on with the three species exhibited, in order to test the effect of chemical feeding as compared with the method outlined above, with the object of producing hereditary melanism.

Papers.

The following papers were read :—

1. "A contribution towards the Insect Fauna of French Oceania," by Miss L. E. CHEESMAN.
2. "Extra wings in Lepidoptera," by Dr. E. A. COCKAYNE, M.A., F.R.C.P.
3. "The larvae and pupae of the genus *Hyperochia* (Dipt. Asilidae)," by W. H. THORPE, B.A.
4. "A List of the Geometridae (Lep. Heterocera) known to occur in the Island of São Thomé, with descriptions of some new species collected by T. A. Barns," by L. B. PROUT.
5. "A List of Noctuidae, with descriptions of the new forms, collected in the Island of São Thomé by T. A. Barns," by Miss A. E. PROUT.

Wednesday, May 4th, 1927.

Mr. J. E. COLLIN, President, in the Chair.

10th International Congress of Zoology.

The PRESIDENT announced that the Council had nominated LORD ROTHSCHILD, F.R.S., and Mr. G. T. BETHUNE-BAKER, as the delegates of the Society to the 10th International Congress of Zoology, to be held at Budapest in September 1927.

Wicken Fen.

The TREASURER made a statement respecting Wicken Fen, and stated that the National Trust had approved the policy of making it primarily an insect reserve. He made a further appeal for funds towards its maintenance for this purpose.

Protection of British Lepidoptera.

Mr. H. M. EDELSTEN, Secretary of the Committee for the Protection of British Lepidoptera, made an appeal for assistance in re-establishing certain British butterflies.

THE OVIPOSITION HABITS OF A MOSQUITO.—Dr. P. A. BUXTON showed photographs of breeding places of *Aedes (Stegomyia)* spp. in Samoa and other parts of Oceania. He then described experiments designed to analyse the tropisms of the female mosquito, which result in her laying eggs in certain definite places. The female's behaviour is the resultant of a number of tropisms: those towards water vapour (and perhaps dark) are towards a definite concentration of stimulus, which is not maximal: there are apparently a number of general factors, which guide the female to the neighbourhood of water, and a second group which determine whether the liquid itself is suitable.

MELANIC EXAMPLES OF *SELENIA BILUNARIA*.—Dr. E. A. COCKAYNE exhibited on behalf of Mr. W. MANSBRIDGE two melanic specimens of *Selenia bilunaria*, the only markings being two pale transverse lines running across the wings, bred in York-

shire 1915 by A. S. Tetley of Scarborough; also a melanic *S. bilunaria* bred by Dr. J. W. H. HARRISON in the course of his experiments with manganese salts, this form being almost identical with that bred by Tetley.

He also showed a melanic *S. bilunaria* bred from a larva found at Witherslack. This has a very dark ground-colour, but all the usual markings, light and dark, are plainly visible.

Harrison states that Tetley was most reliable and that these insects cannot have come from his stock. Being unaware of their existence, when he wrote his paper on "The Induction of Melanism in the Lepidoptera and its Subsequent Inheritance," he claimed to have produced a melanic form of a species in which melanism was previously unknown.

THE EARLY STAGES OF SOME BRITISH FEN MOTHS.—MR. H. M. EDELSTEN exhibited various rush and reed stems together with some photographs to show the early stages of some of the British Fen Moths in illustration of his remarks.

VARIETIES OF *PAPILIO MACHAON*.—LORD ROTHSCHILD exhibited a series of varieties of *Papilio machaon*, Linn., and two larvae. He said that of the four melanistic specimens exhibited, three were from Norfolk and the fourth from Germany; 1 ♂ 1 ♀ from Norfolk and the German ♂ were completely black and were wild caught. The second ♂ from Norfolk had been bred from a wild-taken pupa and showed traces of paler ground-colour as well as of the red anal ocellus on the hind-wings. The fourth known melanic example from Great Britain was a ♀ bred by L. W. Newman and now in the collection of Mr. Percy M. Bright; this ♀ was entirely black. Albinistic examples were much rarer than melanistic specimens, and besides the two exhibited he only knew of two others. The British albino exhibited was bred from a Wicken Fen pupa by Houghton and was bought at the sale of the Rev. Joseph Greene's collection in 1906. The three minor varieties shown were bred in Germany and probably not from wild-taken pupae, though the forms have often been taken wild. The melanic larvae invariably produce normal imagines.

AN EARLY RECORD OF THE SCENT OF THE MALE *PIERIS NAPI*, L., IN ENGLAND.—Prof. POULTON drew attention to the following note in the *Entomologist's Monthly Magazine*, Vol. 19, p. 236, 1882-3, by the Rev. C. Mathew Perkins, who wrote, 27 Jan., 1883, from Sopworth Rectory, Chippenham:—"My son [Dr. R. C. L. Perkins, D.Sc., F.R.S.] who is a real lover of the science of entomology, has noticed this last season, that the male of *Pieris rapae* has a distinct scent when alive."

This note, written when Dr. Perkins was at school, was not seen by him until some years later when he wrote (*E.M.M.*, Vol. 24, p. 11, 1887-8), stating that the species was *napi*, not *rapae*, and that the observation was made not at Sopworth in 1882, but much earlier and at Nash, near Pembroke. He also said that, on first discovering the smell of a ♂ *napi*, taken in the fingers, he was struck with its close likeness to that of the Sweet-scented Verbena; and added—"The scent is very similar to that emitted by many species of *Nomada*, *Prosopis*, *Psithyrus* (*Apathus*, N.), among bees, and in all three cases it may be for the same purpose as in *H. hectus*." * The next number of the *E.M.M.* contains a note (*ibid.*, p. 40) by Count

* Dr. Perkins was here referring to some interesting notes on this species in *E.M.M.*, Vol. 19, p. 90, 1882; Vol. 23, p. 110, 1886.

E. de Selys-Longchamps, stating that he had been aware of the odour of *napi* since 1829 and had published the fact in 1844. He had likened the odour to that of thyme, but agreed that Dr. Perkins' comparison was more exact.

Dr. Perkins had kindly written the following note on the subject:—"28 May, 1927.—It was in one of the years prior to 1876 that I first noticed the odour of ♂ *napi*. I can be sure of this, as the latest year in which I can possibly have visited Nash, near Pembroke, S. Wales, was 1875, and it was there that I first noticed this scent. Further, as I observed it on at least two of my almost yearly summer visits (up to 1875) to that place, the date of first observation must have been at least as early as 1874, when I was eight years old. I should have thought, however, that I was younger when I first noticed the odour of *napi*, and this impression may be correct. It must have been quite casually that I mentioned the fact to my father in 1882 when he inferred that I was speaking of my first experience. As a matter of fact I had been in the habit of frequently catching the butterfly for the sake of the odour every season since the time when I first knew that it existed—at least eight years before I mentioned the subject to him."

Fritz Müller's classical papers* on the scent-organs of Lepidoptera were published in 1877 and 1878, and it was of much interest that this now well-known and striking example should have been discovered independently at an earlier date in this country, although not recorded until 1883, by a young naturalist about eight years old. Much the earliest record, is, however, that of de Selys-Longchamps.

THE NORTHERN RACE OF *AGLAIS URTICAE*, L.—Prof. POULTON said that his friend Mr. R. W. Lloyd had drawn his attention to the following record in the *Proceedings of the Entomological Society of London* for 1898 (pp. xl, xli):—"Dr. Chapman, Mr. Lloyd, and Mr. Nicholson exhibited butterflies taken by them in Norway from June 20 to July 22, during the past summer [1898] at Saeterstøen and Bolkesjö, about 60° 12' N., and Bossekop, 60° 50' N. . . . It was . . . seen that the northern races of butterflies and moths were apt to differ a little from those of the mid-European fauna, but that various named varieties supposed to be characteristic boreal representatives of their species, were often rather aberrations, and not the dominant northern type. This was the case in *Vanessa urticae*, *Erebia medusa*, *E. ligea*, etc.; on the other hand, as in *Brenthis selene*, var. *hela*, the entire local race was of the variety." Of *urticae* "about half the specimens bred were shown, the larvae from Kaaiford near Bossekop. Many specimens resembled English ones, though the average was much darker than that of English examples. One or two approached var. *polaris*, which was not actually represented. *Polaris* appeared therefore not to be a northern race, but an aberrant form no doubt more frequent there than in England."

During the summer of 1926 the opportunity was afforded of studying the Norwegian *urticae* and confirming the above observations. Measurement of the length from base to apex of the fore-wing in the following captured specimens showed that the race is small as compared with that of more southern Europe, including Britain.

* Many of these papers were published, translated by E. A. Elliott, F.Z.S., as an appendix to Dr. G. B. Longstaff's *Butterfly-hunting in Many Lands*, London, 1912.

F.W. of ♀	taken	16 July 1926,	by	A. E. Gray	at	Loen	was	25.0 mm.	long.
„ ♂	„	18	„	„	E. B. Poulton	at	Balholmen,	Sogne Fjord,	was
								22.0 mm.	long.
„ ♂	„	21	„	„	J. Hellowell	at	Ulvik,	Eid Fjord,	was
								20.0 mm.	long.
„ ♂	„	21	„	„	Miss C. Longfield	in	Lilledal Valley,	Sundal	
							Vall.,	was	24.0 mm.
								long.	
„ ♂	„	24	„	„	Miss C. Longfield	in	Lilledal Valley,	Sundal	
							Vall.,	was	21.0 mm.
								long.	

With the exception of the largest male, these specimens agreed well with Dr. Cockayne's bred specimens from Lapland (p. 27). The specimens also differed from more southern examples in the smaller size of the blue spots in the H.W. border, the deeper tint of the red colour on both wings, the narrower red band of the H.W., the more intense black of the dark markings on the under surface of both wings, and the much darker shade of the band between the basal and marginal black of the H.W. under surface.

The existence of colonies of larvae on a nettle-bed at Balholmen suggested the possibility of determining whether the above characters were caused by the influence of conditions on larval or pupal life, or were of germinal origin. The larvae were collected on July 18 and kept in dark boxes in the cabin until July 23, when they were taken to Oxford and from this time given light and space as described on p. 28. Neither on the ship nor at any later time was there any difficulty in supplying abundant food. On August 13 the pupae which then remained were taken to St. Helens, Isle of Wight, where they emerged.

Company A of large larvae yielded eight butterflies of which seven emerged between August 5 and 7, and one on August 11.

Company B of small larvae yielded seventeen butterflies, which emerged between August 12 and 16.

In addition to the above, four larvae collected, July 21, at Ulvik by Mr. J. W. Bodger, F.L.S., yielded one butterfly on August 6 and two on August 12.

It was clear that the larvae of B were subjected to new conditions for a larger part of their life than the larvae of A; and, if such conditions are effective, we should expect the butterflies of A to be somewhat different from those of B, and the butterflies of all three series to be different from those taken in Norway. But all the bred specimens were of the small dark form, and, with few exceptions, very uniform in appearance.

Thus the earlier observations were confirmed, the racial status of this northern form established, and, since it was obviously convenient that it should bear a name, *Aglais urticae septentrionalis* was proposed for it.

Male Type from Balholmen, Norway, in the Hope Dept., Oxford University Museum; Paratypes in the British, Oxford, Tring, and Witley Museums.

Dr. E. A. Cockayne gave the following account of his experience of the northern forms of *urticae* :—

“ During the year I spent at Yukanski near Cape Sviatoi Nos in Russian Lapland I found a small but flourishing colony of *Aglais urticae* in the village of Yokanga.

I brought home three hibernated specimens caught wild, and before leaving took some larvae nearly full-grown and put them on a large plant of growing nettle. Later on at Pechenga I took some more larvae and a few pupae.

"The wing measurement taken from base to apex of the fore-wing of the captured specimens, was in the male 24 mm. and in the two females 27 mm. The measurements in the bred specimens varied from 20 to 24·5 mm., the majority being between 22 and 23 mm. I do not think any were stunted in growth by being kept in captivity, and, though those from Yokanga may have suffered from scarcity of food, there was an ample supply of nettle for the larvae at Pechenga. Had it not been for the two large captured ones I should have had no doubt that the race was a small one as well as a dark one, like that shown by Professor Poulton."

BRILLIANTLY GOLDEN PUPAE OF *AGLAIS URTICAE*, L., NORMALLY PRODUCED ON GREEN LEAVES AND STEMS.—Prof. POULTON exhibited the pupa-cases from which some of the Norwegian *urticae* had emerged and pointed out that the dark and golden forms were easily distinguishable after the emergence of the butterflies. There had been much difference of opinion about the cause which produced these golden pupae in nature, some naturalists believing that they were always due to parasitism.

T. W. Wood had shown that such pupae were not necessarily parasitised (*Proc. Ent. Soc. Lond.*, 1867, pp. xcix–ci).

E. B. Poulton (*Phil. Trans. Roy. Soc.*, Vol. 178 (1887) B, p. 311) had described three golden pupae, all parasitised, found upon nettle, and suggested that "the process of pupation was hurried on by their abnormal condition" (*ibid.*, pp. 402, 403). That the appearance was not necessarily caused by parasites was abundantly proved by the numbers of imagines reared from the golden pupae produced in the experiments recorded in this paper. The writer, however, then believed that the larvae did not normally pupate on the food-plant but sought other, and generally mineral, surroundings which the dull grey or brilliantly golden pupae would resemble, being produced by the stimulus of light reflected from similar surfaces. The comparatively rare pupae found on the nettle were believed to be due to hurrying on of the process brought about by parasitic attacks.

This explanation was soon shown to be incomplete by the late Dr. W. Hatchett Jackson who wrote in 1890—"Among the nettles brought to me I found two pupae of *V. urticae* of the most brilliant golden and green hue, so golden and green, in fact, that my friend Mr. Poulton declared them both to be ichneumonised. He was right as to one, and wrong as to the other, which produced a perfect butterfly" (*Trans. Linn. Soc. Lond.*, Zool., 2 Ser., vol. v, p. 157 n., 1890).

Poulton in 1892 brought further evidence that healthy golden pupae "are known to occur, although rarely, upon the leaves of nettles" (*Trans. Ent. Soc. Lond.*, 1892, p. 476), referring to an observation of his own (p. 382) and quoting in a footnote to page 476, the late F. Merrifield's experience of about a dozen golden pupae, from one company, attached to nettle-stalks. Of these pupae about half were parasitised, while the other half yielded imagines. On the other hand, about fifty golden pupae of another company, found by Merrifield a few days earlier (in the last week of August 1892) attached to nettle-stalks or other stalks among them, were, without exception, parasitised.

Finally in 1917 (*Proc. Ent. Soc. Lond.*, p. lvi) Poulton showed that the grey pupa as well as the golden one may be the victim of parasites, and concluded that "the normal effect of the green leaves of the nettle was to produce golden pupae—the nearest approach to green of which this species was capable."

The companies of Norwegian larvae afforded the opportunity of testing the above conclusion by further experiments, suggested by finding a single golden pupa attached to a nettle-stem at Balholmen, on 18 July, 1926. The pupa was apparently healthy, but, being accidentally left behind in the cabin before emergence, there was no chance of confirming this impression.

A. *The company of large larvae from Balholmen.*—Seven of these larvae pupated on the lid of a cardboard box with a brown lining, and one more fell to the bottom. The closed box was kept in a rather dimly lighted cabin, so that the larvae and pupae were in nearly complete darkness. All eight pupae were very dark with no trace of gold. The ninth larva pupated later, after the return to Oxford on July 23, suspending itself from the blue-green gauze roof of a glass cylinder, near the nettle-leaves and producing a dull golden pupa which, even after emergence of the imago, formed a marked contrast with the first-named seven pupa-cases. All the pupae except the one which fell, produced normal butterflies.

B. *The company of small larvae from Balholmen.*—All these larvae were fed in their later stages and passed the prepupal period in glass cylinders, or, as regards one group, in a glass shade. All these receptacles were well filled with nettles, the stems passing through a hole in a plate into water below. It is to be understood that all pupae were formed near to nettle-leaves even when attached to the roof, or the glass sides. The roof, unless otherwise stated, was a blue-green gauze.

(1).—Of six larvae in a large glass shade (similar to the one shown in *Trans. Ent. Soc. Lond.*, 1892, pl. xv, fig. 4), one pupated low down on the nettle and was brilliantly golden, while five pupated in a clump—four on the faded green gauze roof, and one on the glass close by. All were more or less golden, but none so brilliant as the isolated example. The pupa fixed to the glass died, apparently as the result of attack by a Syrphid larva.

(2).—Of four larvae in a large cylinder, one, low down on the nettle, was golden, but not very brilliant. The remaining three formed a compact clump, two being attached to the white muslin roof and one to the glass close by. The last, by far the least brilliant, was dully gilt anteriorly, with bright spots, while one of the others was about equal to the pupa suspended from nettle, the second less bright, but more so than the pupa attached to the glass.

The remaining larvae were placed, two together, in moderate-sized cylinders.

(3).—The two pupae were suspended, about half-an-inch apart, from the gauze roof. Both were brilliantly golden, nearly equal to the brightest of (1).

(4).—One pupa, suspended from the roof, was brilliant but not quite so bright as the above two (3). The second, low down on the glass, resembled the first, but was apparently attacked by a Syrphid larva which remained clinging to it for some days. This pupa died.

(5).—One larva died while the other produced a brilliant golden pupa suspended from the roof.

(6).—The two pupae were fixed, about a quarter-of-an-inch apart, to the roof. One was a dullish gold, the other pale grey with golden flecks.

(7).—One pupa, suspended from the roof, was brilliantly golden; the other was attached to the nettle, but so low down that its weight was partially supported by the white plate and its posterior segments bent round to form a right angle with the others, as in freshly exposed pupae which fall to the ground. This pupa was dullish gilt.

All the pupae except three—one each in (1), (4), and (5)—produced butterflies, fifteen normal and two somewhat imperfectly expanded.

C. *Four larvae from Ulvik*.—One larva produced a dark pupa in a cardboard box under conditions similar to the seven pupae of series A. Three pupated in a compact clump—one on the nettle and two on the faded green gauze of a cylinder. The pupae were dark and lustreless. Three normal butterflies emerged.

These experiments proved once more and conclusively that the golden pupae of *urticae* are produced normally and have no necessary connexion with parasitism; also that they are produced when the larva pupates on or close to the green leaves of the nettle, the most brilliant results being obtained when the larva is isolated, the least brilliant when they hang in clumps and are therefore exposed to the light reflected from the dark skins of their neighbours.

The pupae of *urticae* are most perfectly concealed on rocks, and well concealed on rough tree-trunks. Furthermore, dark or light grey forms, matching the dark or light surfaces are produced in response to the stimulus of reflected light upon the larvae. In correspondence with the strong procryptic resemblance to such backgrounds the mature larvae possess the instinct to wander far from the nettle-bed and thus stand a good chance of meeting the most favourable environment. But their time is limited and they are sure often to fail and be compelled to pupate among green leaves and stems. In response to these conditions they have the power of producing golden pupae which are less conspicuous among the green leaves than the dull dark pupae would be. I formerly believed (see p. 27) that parasitism hurries on the pupation of this species so that the sensitive prepupal period is passed through on the food-plant with the production of golden pupae. It is, however, certain that some unparasitised larvae do not exhibit the wandering instinct but suspend themselves from the nettles, and it seems probable that the high percentage of parasitism among the golden pupae is to be explained by the abundance of Chalcids and other parasites which haunt the food-plant, searching for VANESSIDAE, etc., and that the wandering instinct and the usual procryptic resemblances of the pupa have been developed as an escape from these and other dangers of pupation in the nettle-bed.

THE FORM *FULVESCENS*, OBERTH., OF *ACRAEA JOHNSTONI*, GODM., BRED BY CANON K. ST. AUBYN ROGERS FROM A COMPANY OF LARVAE WHICH ALSO YIELDED OTHER FORMS.—Prof. POULTON said that he wished to correct a statement he had made, in *Proc. Internat. Entom.-Kongr.*, II, Zürich, 1925 (Weimar, 1926), p. 516, that the four examples of *fulvescens* in the Tring Museum, described by Dr. Eltringham in *Trans. Ent. Soc. Lond.*, 1911, p. 7, pl. I, fig. 1, formed the only record of the breeding of this extremely well-marked form. That they were the only *published*

record was entirely his fault. The deeply interesting family, exhibited to the meeting and analysed below, was bred by Canon Rogers from a company of larvae in the second stage, taken by him in 1915, at Sagalla Mountain (abt. 3500 ft.), in Kenya Colony, about 100 m. W.N.W. of Mombasa. The fourteen imagines, which emerged between the 13th and 20th of August (both days inclusive), belonged to the following forms :—

A. Form *confusa*, Rogenh., with white F.W. spots and pale ochreous H.W. patch—1 ♂ 4 ♀.

B. Form *flavescens*, Oberth., all markings ochreous—1 ♂.

C. Forms with paler markings transitional between A and B—3 ♂.

D. Form *fulvescens*, Oberth.—3 ♂ 2 ♀. The pale markings of F.W. very distinct in 1 ♂ and especially in the 2 ♀. The squarish pale basal patch of H.W. distinct in these last-mentioned three specimens, especially in one of the females.

DIPTERA AND HYMENOPTERA TAKEN IN TWO HOURS ON THE WINDOWS OF A HOUSE AT SEAVIEW, ISLE OF WIGHT.—Prof. POULTON exhibited the specimens captured by him between 3.30 and 5.30 p.m., 7 September, 1921, on five upper sashes of a curved bow, in "Horestone," at Seaview. The house is close to the sea, which is overlooked by the five north-facing windows. There is also a glazed door at the opposite end of the room, behind which the ground rises steeply, forming a wooded slope with a varied vegetation favourable to insect life. There can be no doubt that the insects mainly enter by the south door which in the afternoon is shielded from the sun, and, flying towards the strong north light, are entrapped by the windows of the bow. Most of the captures were made near the top of the sashes.

The Diptera were studied by the President, who has very kindly determined them and prepared the following list of the 17 families, 31 genera, 46 species, and 149 specimens (54 ♂ and 95 ♀) contained in the collection :—

MYCETOPHILIDAE. *Tetragoneura sylvatica*, 1 ♀.

LIMNOBIIDAE. *Geranomyia unicolor*, 1 ♀. A sea-coast species.

DOLICHOPODIDAE. *Dolichopus virgultorum*, 1 ♀. *Hercostomus* sp., 1 ♀.

PHORIDAE. *Aphiochaeta melanocephala*, 14 ♂, 22 ♀. Often common on windows. *A. rata*, 1 ♂, 2 ♀. *A. ?pygmaea*, 1 ♀. *A. sp.*, 1 ♂.

TACHINIDAE. *Cinochira atra*, 1 ♂. A remarkable capture, v. Note.

MUSCIDAE. *Stomoxys calcitrans*, 1 ♀. *Musca autumnalis*, 1 ♂. *Morellia hortorum*, 2 ♀.

ANTHOMYIIDAE. *Polietes lardaria*, 2 ♂, 1 ♀. *Mydaea lucorum*, 1 ♀. *Limnophora triangula*, 1 ♀. *Hebecnema umbratica*, 1 ♀. *Hydrotaea irritans*, 2 ♀. *Homalomyia canicularis*, 4 ♀. *H. manicata*, 1 ♀. *H. sp.*, 1 ♀. *Azelia* sp., 1 ♀. *Piezura pardalina*, 1 ♀. *Hylemyia strigosa*, 1 ♀. *Chortophila* sp., 1 ♀. *Fucellia maritima*, 1 ♀. A sea-coast species.

CORDYLURIDAE. *Scatophaga inquinata*, 1 ♂.

BORBORIDAE. *Limosina sylvatica*, 1 ♀. *L. heteroneura*, 1 ♂. *L. appendiculata* 1 ♂. *L. fungicola*, 1 ♂. *L. fontinalis*, 1 ♀. *L. clunipes*, 1 ♂, 1 ♀. *L. brachystoma*, 1 ♀. Often very common on decaying seaweed. *L. ? crassimana*, 1 ♂.

PIOPHILIDAE. *Piophila varipes*, 1 ♀.

- SAPROMYZIDAE. *Peplomyza wiedemanni*, 3 ♂, 1 ♀.
 MILICHIIDAE. *Madiza glabra*, 1 ♂, 4 ♀. Not rare on windows.
 EPHYDRIDAE. *Psilopa (Ephygrobia)* sp., 6 ♂, 10 ♀. A sea-coast species.
Discocerina (Clasiopa) calceata, 1 ♂, 1 ♀. *D. (C.)* sp., 9 ♂, 10 ♀. A sea-coast species.
 DROSOPHILIDAE. *Drosophila funebris*, 2 ♀. *D. tristis*, 2 ♀. *D. melanogaster*, 2 ♀.
 ASTIIDAE. *Astia amoena*, 7 ♂, 7 ♀. Often common on windows.
 CHLOROPIDAE. *Oscinis lineella*, 1 ♂, 1 ♀.
 AGROMYZIDAE. *Agromyza reptans*, 1 ♀.

The most interesting capture was a Tachinid, concerning which the President has written :—

“*Cinochira atra*, Zett. This is a very little-known Tachinid which one might easily mistake at first sight for a Cordylurid or Anthomyid. It was first recorded as British in 1912 from specimens captured by Col. Yerbury and myself near Woodbridge in Suffolk (*Ent. Mo. Mag.*, 1912, p. 192). Subsequently on May 20th, 1914, I caught a single male at St. Germans (Cornwall). It is one of the last species one would expect to find on a window, but curiously enough, very shortly after I had identified the Isle of Wight specimen, when naming some Diptera for my friend the late Mr. F. Jenkinson, I found that on August 1st, 1921, he caught a male which he told me was taken on a window of his house at Cambridge.”

The Hymenoptera were represented by comparatively few species. Five workers of *Vespa germanica*, F., and a female of the Fossorial wasp *Mellinus arvensis*, L., were doubtless hunting the MUSCIDAE.

Among the Chalcids, the EULOPHIDAE included two species—*Eulophus anemopsisimus*, Walk. (11 ♀), a Staphylinid parasite, and *Elachertus dimidiatus*, Nees (7 ♀), probably a parasite of Lepidoptera; the PTEROMALIDAE included *Pteromalus muscorum*, L. (4 ♀), common in houses with flies; the ENCYRTIDAE, 57 examples of a minute undetermined species, probably parasitic on Lepidopterous larvae.

The CYNIPIDAE were represented by *Aegilips* sp.? *dalmanni*, Reinhard (3 ♂), probably a parasite of APHIDAE.

The examples of these last two groups were kindly determined by Dr. J. Waterston, D.Sc.

THE FERTILIZATION OF ORCHIDS OF THE GENUS *OPHRYS* BY THE MALES OF HYMENOPTERA ACULEATA.—Prof. POULTON drew attention to the work of Monsieur M. Pouyanne, Conseiller à la Cour d'Appel, Alger, on the fertilization of three Algerian Orchids—*Ophrys speculum*, Link; *lutea*, Cav.; and *fusca*, Link. Although these interesting researches were published eleven years ago (*Journ. de la Soc. Nat. d'Horticulture de France*, Febr. and Mar., 1916; Aug., 1923), they had only recently become known to him through the kindness of Prof. Study of Bonn, and he believed that they were equally unknown to most entomologists. The observations had been repeated and abundantly confirmed by Col. M. J. Godfery, F.L.S. (*Journ. Bot.*, Febr. 1925, p. 33), who had kindly sent a copy of his paper for the Society's library, so that Fellows would be able conveniently to study the details of this fascinating

inquiry. The work of Pouyanne and Godfery had been recently quoted at length from the original memoirs by Monsieur J. Houzeau de Lehaie (*Bull. des Naturalistes de Mons et du Borinage*, t. vii, 4, July-Sept. 1925, p. 69).

The most essential element in this discovery was the fact that the fertilizing insects are the males of certain burrowing Aculeates which, emerging from the earth several days or even a few weeks before the females, continue to haunt the locality on the look-out for the first appearance of the latter sex. During this period they are irresistibly attracted by anything which bears even a rough resemblance to the female. The flowers of the three species of *Ophrys*, which commonly grow near the colonies of the burrowers, open at this critical period in the life of the males and present a superficial likeness to the females or to some characteristic feature of them. These flowers are eagerly sought by the males, and they will seek and settle upon those of *O. speculum* even when picked and held in the hand. The attraction is entirely sexual; the flowers do not produce insect-food and the visiting males do not seek it, but are entirely engrossed in the actions called forth by the sexual stimulus. Usually the flowers which open first are chiefly sought and more frequently fertilized, while the last are often neglected.

Ophrys speculum was fertilized by the male Scoliid, *Dielis ciliata*, F., and this species carries off the pollinia on its head, which is turned towards the centre of the flower, the sexual activities being manifested towards the periphery, which is thickly clothed with long red hairs like those which cover the body of the female. Pouyanne had observed this species of *Ophrys* for twenty years in many Algerian localities and the method of fertilization was always the same.

Ophrys lutea, fertilized by males of *Andrena nigro-olivacea*, Dours, and *A. senecionis*, Perez; and *Ophrys fusca*, fertilized by males of *Andrena trimmerana*, Kirb., and *A. nigroaenea*, var. *nigrosericea*, Dours, offered a differently placed stimulus, and the males quickly turned on alighting so that the head faced the periphery, attempts to pair were made at the centre, and the pollinia were carried off and brought into contact with another flower by the end of the abdomen.

Insect visits to *Ophrys fusca* and the carrying away of a pollinium, only once seen by M. Pouyanne in Algeria, had been observed at Hyères twice by Col. Godfery and twice by Maj. Van der Weyer. Two of the bees were captured and determined as the two last-named species of *Andrena* by M. Lucien Berland of the Paris Museum of Natural History.

Col. Godfery has also observed the visits of *Andrena trimmerana* to *Ophrys arachnitiformis* at Hyères and the carrying of the pollinia on the head (*Journ. Bot.*, 1922, p. 359), so that, as he records, the position assumed is that of the *Dielis* on *O. speculum*.

M. Pouyanne has also proved that there is some other sexual attraction, probably a scent, present in *O. speculum*; for the males of *Dielis* were strongly excited by the flowering spikes even when concealed in newspaper. A cardboard covering gave varying results. It will be of great interest to determine whether the same attraction is present in the other species of *Ophrys*. Col. Godfery informs me that *O. lutea* has a distinct scent, somewhat resembling lemon.

M. Houzeau de Lehaie (*ibid.*, pp. 81, 82) had made the interesting suggestion that the advantage of this association may not be confined to the plant, but that

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SESSION 1927-1928.

1927.

Wednesday, October	5
" "	19
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1928.

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The Chair will be taken at Eight o'clock.

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